

Successful Methods

Construction • Road Making • Engineering • Industrial • Mining



Vol. 3 October 1921 No. 10



LAKEWOOD METHODS AND MACHINES

Store Road Materials Now for 1922

Twenty-nine states will allow estimates for material stored on the job *now* for next year's road work. If your job will run over into next season, store enough materials *now* to assure an early start next Spring.

The tunnel method has been accepted, generally, for storing materials. We've developed some ideas on tunnel construction that may interest you. We'll be glad to send blue prints and complete information. No obligation on your part.

Wayne County, Michigan, believes in winter storage of material to assure an early start in the Spring.

EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA
67 Lombard St. New York, U.S.A. Cable: ALMACOA New York



The Lakewood Engineering

Company, Cleveland U.S.A.

Successful Methods

A Magazine of Construction Service

Published by SUCCESSFUL METHODS, Inc.

F. A. SMYTHE, President

S. T. HENRY, Vice-President and Treasurer

WILLIAM JABINE, Secretary and Editorial Director

141 Centre St., New York City, N. Y.

Vol. III

OCTOBER, 1921

No. 10

World Champion Concrete Road Builders

WHO are they? That is what SUCCESSFUL METHODS is going to try to find out. We are going to do our best to locate the outfit which deserves the title. Even if you and your crowd are not in the running, lend us a hand in picking the winner.

The full details of how the title will be awarded are given on page 13 of this issue. He who reads may run. There are no entry fees, but there are some worth while cash prizes. There are no conditions which will bar any outfit. Records of work done anywhere with any kind of a plant, written on the blank which appears on page 13, are all that are needed to get into the race.

When the returns are all in, first, second and third prizes will be awarded. You can see by studying the conditions that a freak run on one day cannot win. It's the real outfit that gets this bacon.

We are going to give the stove league something to chew on this winter. Incidentally, something to shoot at when work opens up in the spring. Send your records to us by the end of October. The method of rating puts a premium on team work. If your outfit has done a real job this season tell the world.

Come on, boys—they're off.

Short-Haul Traffic

ONE of the New England railroads has cut almost in half its short-haul freight rates in Boston and vicinity. The results of this move will, of course, be watched closely by other railroads. If it is successful in increasing the volume of short-haul business many other railroads will doubtless consider similar rate reductions.

The significance of the cut is that it was made to regain traffic that was lost to motor trucks. The railroad is not merely trying to keep trucks from cutting in on its business. Nor is it actually doing all that it can to get back business already lost. Motor trucks have developed much traffic that previously did not exist. The railroad is after this new business as well as what it has lost to trucks.

Engineers and contractors around cities and towns probably have been benefited as much as any other class of shippers by motor truck transportation for hauls up to forty or fifty miles. They will get

whatever advantage may come from the new short-haul rail rates.

Another feature of the reduction in rail rates to meet motor truck competition is of greater importance to the construction industry. That feature is the recognition by the railroad of the economy and permanency of highway transport on short hauls. Motor truck haulage is here to stay on an ever expanding scale. More roads and better roads will be demanded to carry it. This demand means a great era of highway building over a long period.

Our Overseas Visitors

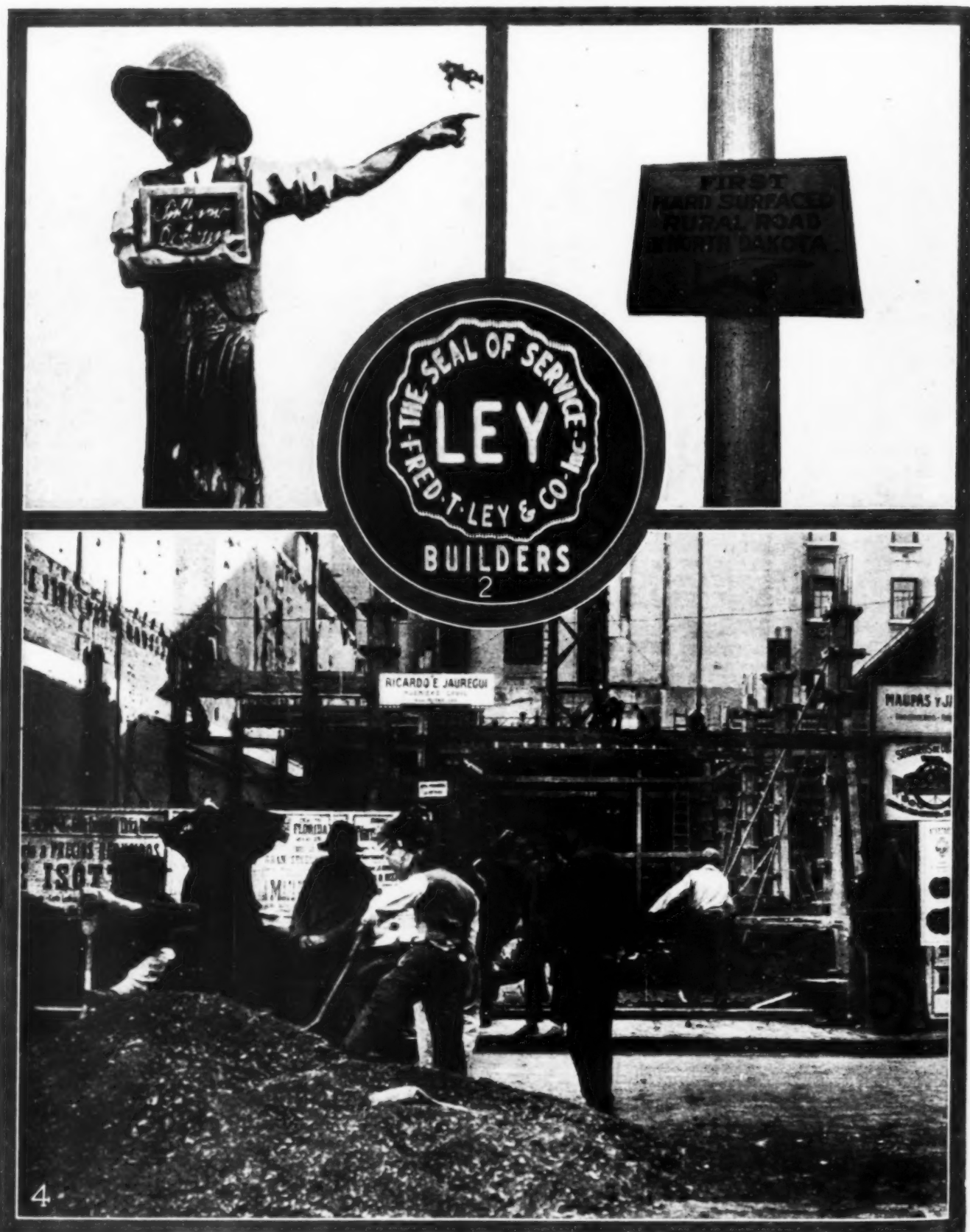
MORE engineers from other countries have been here lately studying our construction and material-handling methods than ever before. The staff of SUCCESSFUL METHODS has had the pleasure of meeting some forty-odd of these foreign visitors in the last two months. This publication also is in touch with many other engineers from overseas who are arranging to come here to see how we do things.

Several developments have brought about this increased interest in American plants and methods. What we did in building the Panama Canal was a surprise to the world. During the war engineers and builders everywhere got a chance to see what our labor-saving ideas and machinery could do in speeding up a big job. Our low unit costs, with the highest labor rates in the world, have recently attracted much attention on account of greatly increased wages everywhere. Engineers are being sent here in increasing numbers to see how we keep down our costs and get work done so quickly.

SUCCESSFUL METHODS has had the opportunity to help some of these men make up their traveling plans at this end. We have introduced them to men in charge of construction jobs and material-handling work all over the country. Our visitors report that the receptions they have received confirm our reputation for American frankness and hospitality.

All of us who come in contact with any of these important men from abroad should do our best to help them study us and our methods. Above all, we must keep in mind that these men have succeeded at home. We should not tell them how to run their jobs. We can, however, show them how we do things with our conditions. Then they, with their ability and experience, can adapt the best of our ways to their problems where they find it advantageous to do so.

Telling Their Stories



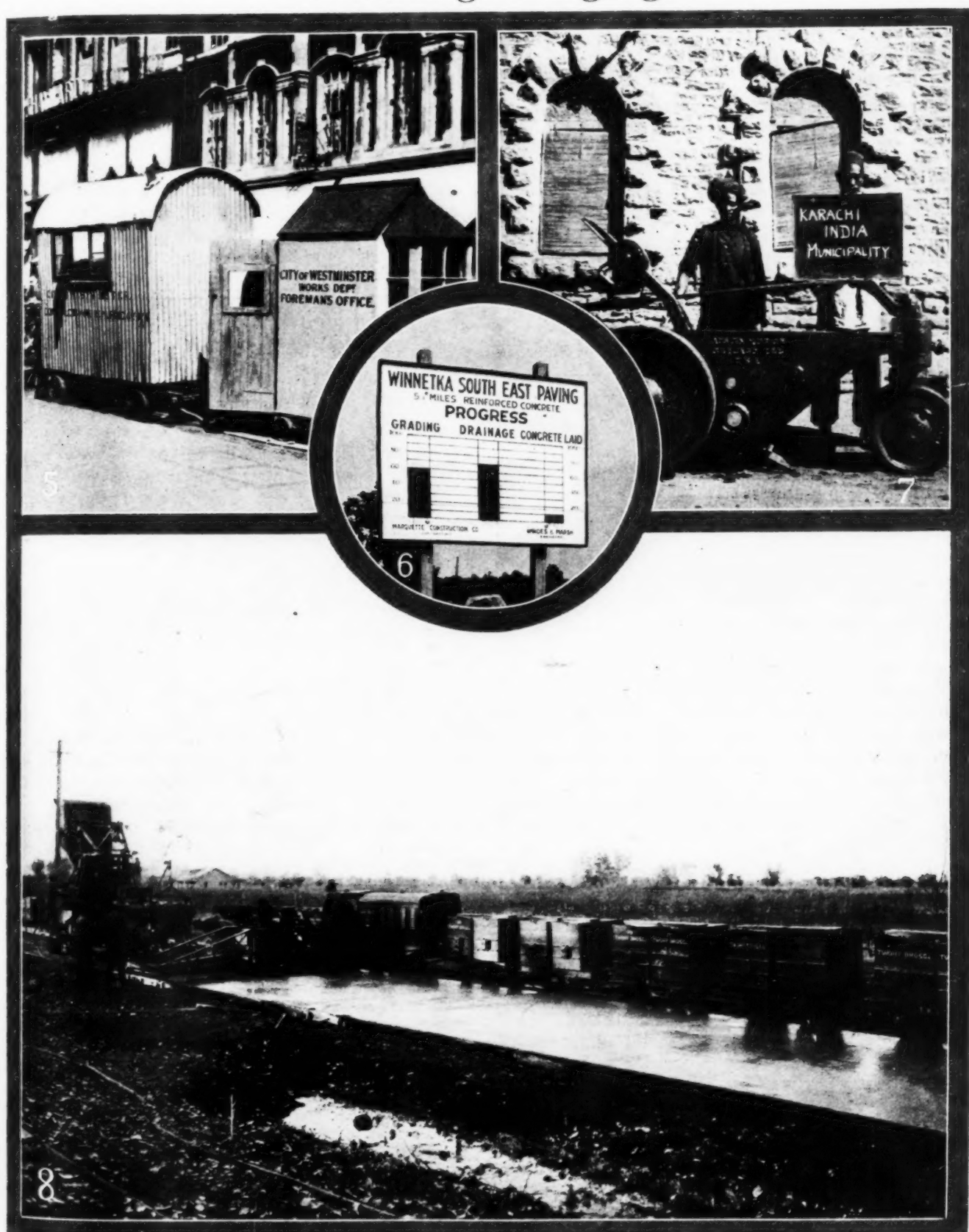
1—A British version of a road sign. This figure, carved from the top of a tree stump, holds a slate which warns motorists that they are approaching a school.

2—A shining example of a contractor who is wise enough not to "hide his light under a bushel." This electric sign several stories in height tells New York that Fred T. Ley & Co. built the Fisk building. It is placed on the walls of the big building high above the streets.

3—North Dakota has marked its first hard surfaced road by this sign.

4—Down in South America the contractors and engineers put their signs on buildings just as is done in the United States, even though their methods of transporting materials may seem a little old-fashioned.

In the Sign Language



5—The city of Westminster, one of the subdivisions of London, carefully marks all of its equipment so that the citizens will know that it is on the job.

6—In Winnetka, Illinois, the progress of a street construction job was recorded from week to week on this sign so that everyone interested might know how the work was getting on.

7—The city of Karachi in India is so proud of its new American made scarifier that an improvised sign was made for use while the machine's first picture on Indian soil was being taken.

8—Every piece of movable equipment on the Maricopa highway job, the country's biggest road construction contract, is marked with the name of Twohy Brothers, who are doing the work.

RAISING THE LOCH RAVEN DAM

Baltimore Contractors Are Well Ahead of Schedule on Water Supply Job

EIGHT months ahead of schedule—that is the record the Whiting-Turner Construction Company of Baltimore is making on the raising of the Loch Raven Dam, a \$500,000 job which they are doing for the Water Department of the City of Baltimore. This record was made possible by the use of modern methods and machines and by taking advantage of almost every labor saving device known, as well as of the topography.

In 1913 a dam across the Gunpowder River at a point about 8 miles below Baltimore was built to take care of the water supply at that time. The foundations and design of this structure known as the Loch Raven Dam, provided for a future increase in height to insure against a water famine and that increase of some 50 ft. is now being constructed. The dam is 824 ft. over all and, as indicated in the illustrations, has a gravity section throughout. The reservoir which will be formed by the dam will contain 23 billion gallons when full and will be connected with a filtration plant in Baltimore by a 12 ft. rock tunnel. Provision is also made for three additional intakes to supply a future 12 ft. tunnel. The raising of the dam 50 ft. requires the placing of about 45,000 cu. yd. of concrete. Work was started by the Whiting-Turner Construction Co. on May 9, and about three months were consumed in assembling and constructing the plant. At the present time the job is about 50 per cent completed.

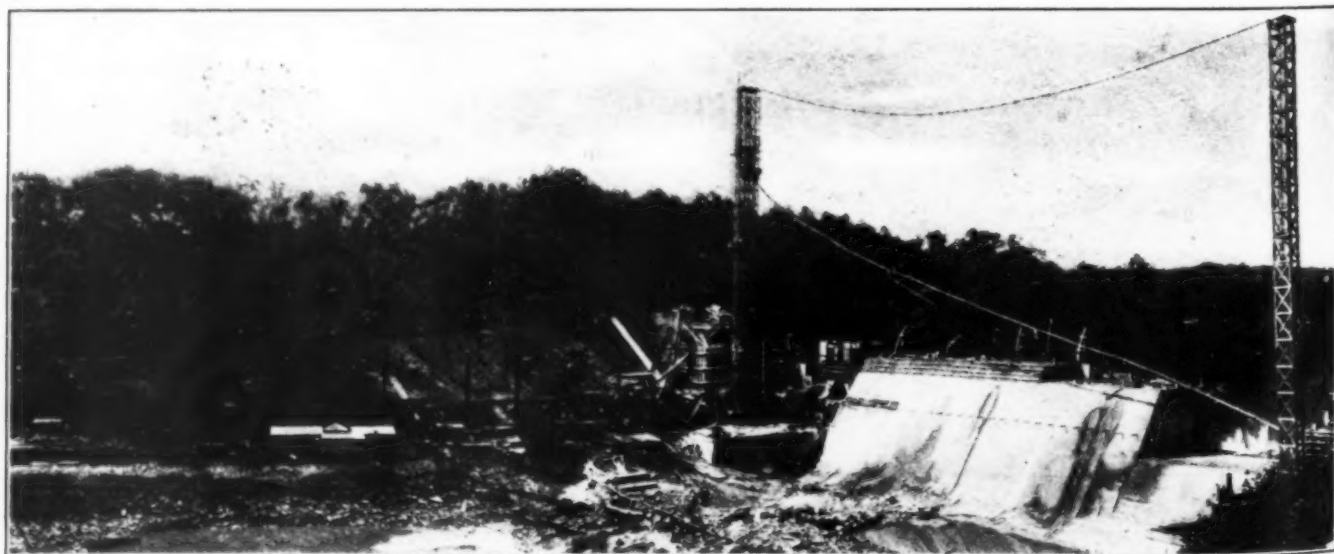


POURING CONCRETE AND WIRING FORMS TO ANCHORS.

On account of the topographical conditions, storage of material was one of the difficult problems which the contractor had to solve. Cement is received on the Maryland Pennsylvania Railroad, a single track road, which runs along the hillside with no space available for sidings. Arrangements were made with the railroad to use part of its main track at a point where it has a passing track on the up-hill side. The railroad

now uses the passing track as its main line and has arranged its schedule accordingly. At this point a cement house with a storage capacity of 5,000 barrels was constructed. Cement is received in bags and can be loaded into the storage shed or directly into trucks as desired, by means of a gasoline operated belt conveyor. This same gasoline motor operates a home-made bag shaker, consisting of a 5-ft. wire cage which rotates about 7 min. for each charge. Cement shaken from bags is reclaimed by shoveling off the floor. From the shed, cement is hauled to a 200 barrel capacity shed located on the roadside adjacent to the plant, and delivered through chutes directly to the mixer platform.

The contractor is operating his own sand plant, a deposit having been found near the job. Sand is dug by means of a revolving $\frac{3}{4}$ -yd. steam shovel and delivered by motor trucks. Rock is quarried and carried $\frac{1}{2}$ mile over 36-in. gage tracks by 18-ton dinkey engines and 4-yd. dump cars. Drilling is done by two



A GENERAL VIEW OF THE WORK SHOWING THE LAYOUT OF THE CONTRACTOR'S PLANT.

well drills putting down 85-ft. holes on about 12-ft. centers 20 ft. back from the face. Considerable secondary chuting is required, which is done with jack-hammer drills, air being piped for all drilling from the main power plant at the dam site. The dump cars are loaded by means of a steam shovel.

In one of the illustrations a trestle may be seen from which the rock cars are dumped into a 1500-yd. daily capacity gyratory crusher. The rock cars are spotted at the foot of the trestle and hauled up the incline by a hoisting engine. From the crusher material is elevated into an overhead bin which is divided into three compartments. The center compartment is for rock, and the two outside sections contain sand. Two 1-yd. mixers are charged through measuring hoppers and discharged into two 1-yd. buckets which are elevated in a twin wooden tower 250 ft. high from which it is spouted to place in the forms by steel chutes. As the main highway is about 50 ft. higher than the bottom of the storage bin, sand which arrives by motor truck is dumped and carried to the hopper by means of a 10-in. belt conveyor. A sand washer was provided, but as yet has not been found necessary. As the stone comes from the quarry it contains a considerable amount of dirt which is separated by the grizzly into a wooden flume. Water waste from the compressor carries this dirt away from the site into ditches.

On account of the length of the dam it was deemed advisable to use an auxiliary or relay tower, which

is shown in the illustration, and which is 160 ft. high. Concrete is re-elevated at this tower and spouted to outlying forms. The daily average is 600 cu. yd. of concrete in 10 hours and 500 cu. yd. has been poured in 5 hours. In the language of William A. Megraw,

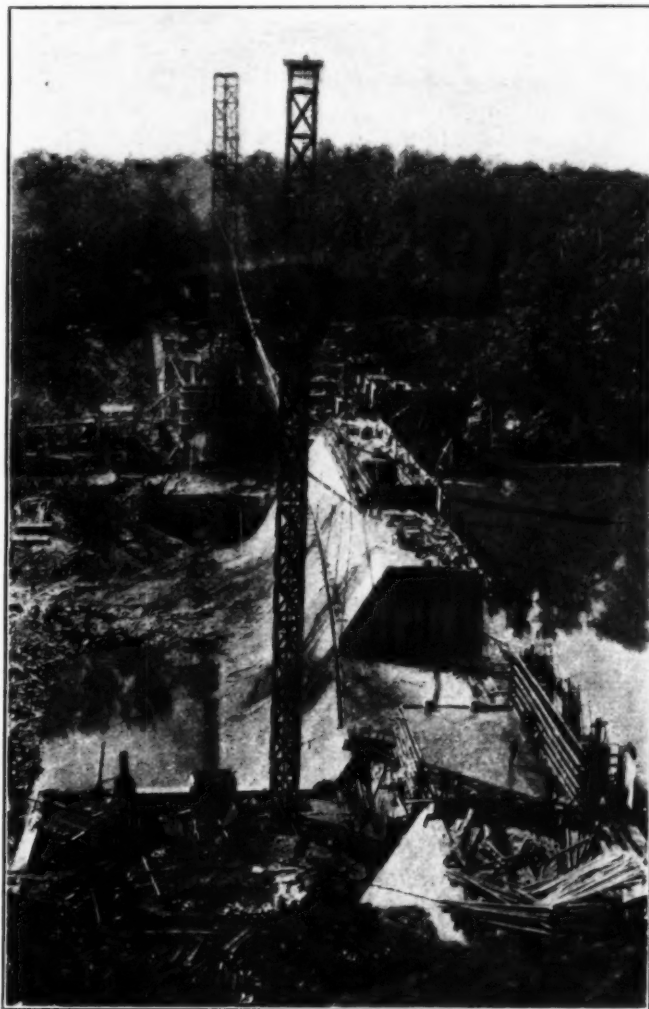
water engineer of the city of Baltimore, "No concrete ever flowed so steadily on any construction job in the neighborhood of Baltimore."

One of the illustrations shows an 8-ft. section of the dam, the front part of which is being concreted and the rear part being formed. One of the features of the design consists of porous precast cinder concrete blocks having a hole through the center which are laid up in the front section at each construction joint to prevent water getting into the joints and causing hydrostatic pressure which would decrease the effective weight of the dam.

The force consists of from 225 to 250 men for whom housing accommodations have been provided near the work. The plant consists of seven hoisting engines with boilers, two derricks, two air compressors, a battery of two boilers, 200-hp. engine, duplex pump for general

water supply and camp purposes. Water is distributed from a wooden tank located on the hilltop.

The date of completion was set for July, 1922, but at the present rate of progress the contract will be finished the middle of November, 1921. J. T. Merritt is superintendent for the contractor. C. K. Allen is resident engineer for the Water Department.



LOOKING ACROSS THE TOP OF THE DAM

UNIVERSITY OF MICHIGAN TO AWARD HIGHWAY FELLOWSHIPS

THE following fellowships will be awarded by the Board of Regents of the University of Michigan not later than Nov. 1, 1921.

The Roy D. Chapin Fellowship in Highway Transport, which provides for the investigation of an approved subject relative to Highway Transport.

The Roy D. Chapin Fellowship in Highway Engineering, which is offered to provide for the investigation of an approved subject relative to hard surfaced roads and pavements.

Two Detroit Edison Fellowships in Highway Engineering, which are offered to provide for the investigation of approved subjects relative to moderate cost country roads.

General Conditions: Each Fellowship pays the sum of

\$250 with an allowance of \$50 for expenses. The holders of these Fellowships do not have to pay tuition fees. A Fellow must hold a Bachelor's Degree from a college of recognized standing. He must enroll as a graduate student in highway engineering or highway transport and as a candidate for the degree of Master of Science or Master of Science in Engineering. He must be in residence for one of the following periods: First Semester (October to February); Winter Period (December to March); Second Semester (February to June). An application for a Fellowship must include a concise statement of the candidate's educational training and engineering experience, and three references. Applications and requests for information should be sent to Arthur H. Blanchard, University of Michigan, Ann Arbor, Michigan.

ROAD BUILDING ON A COLORADO MOUNTAINSIDE

Descent of 900 Feet in Less Than Three Miles Makes a Real Problem of Federal Aid Highway Job



ONE of the most difficult pieces of road building the State of Colorado has undertaken is that officially known as Federal Aid Project No. 78, which is locally known as the Battle Mountain Road. The road is located 30 miles north of Leadville and 18 miles north of the renowned Tennessee Pass, following the Eagle Canyon and forming the gateway to the western slope of Colorado. This project begins at the mining town of Gilman, 9000 ft. above sea level, where the Empire Zinc Company of New Jersey has large holdings, and extends to Rex, which is located 2.7 miles from the beginning and 900 ft. lower in elevation.

The great problem of building a road between these points gave rise to many engineering difficulties, the greatest of which was that of descending 200 ft. within the allowable grade and limit of curvature under which the Federal Aid could be obtained.

The engineers in charge realized that under no condition could any part of the old road be utilized, as it is not different from most of the old roads across the mountains, which were undoubtedly made as good as possible in their day with the means and money

at hand. The road has excessive grades, practically no alignment, and has proved a death scare to tourists. Therefore, it was decided to make a new location.

The estimated cost was \$40,000 per mile, one-half of which is paid by the Federal Government. It may be mentioned that the \$20,000 per mile on this road is the maximum share paid by the Government for any graded road.

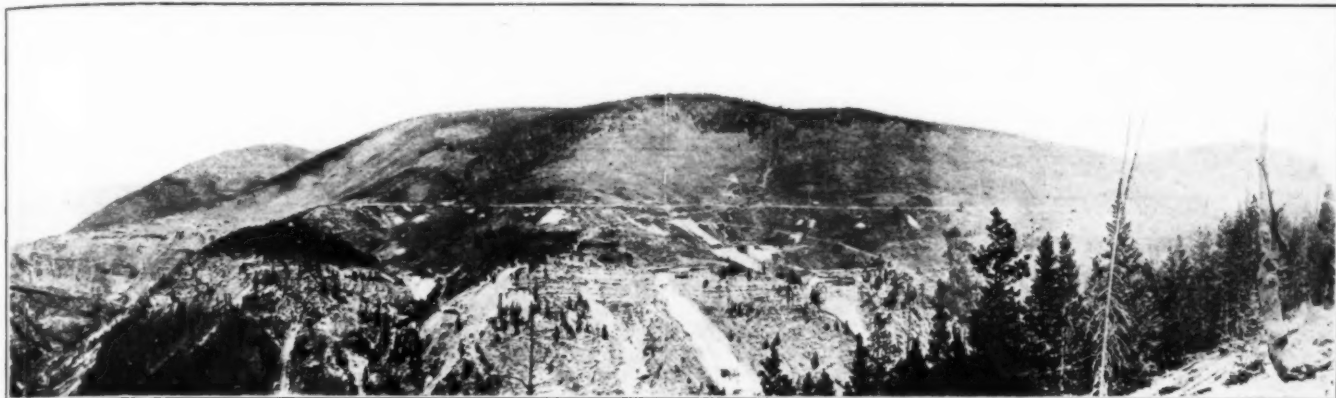
Plans and specifications were submitted to the United States Bureau of Public Roads for approval, and the contract was let to Denton & Crook, engineers and contractors of Denver, Col., who started work June 1, 1920.

During the early part of the work progress was slow owing to the extreme scarcity of labor. It was almost an impossibility to do any excavating with teams as they could be used only for hauling. A 5-cu. yd. capacity steam shovel was employed for the excavating and proved a wonder, working all through the winter season. During the period the shovel was occupied on the lower end of the road, a compressor was installed on the upper end and rock men employed to do the shooting ahead. The high explosive TNT supplied by the Government proved a splendid asset in this work.

There is in this project 20,000 cu. yd. of solid rock,



A SECTION OF THE NEW HIGHWAY NEAR REX. THE ROAD CAN BE SEEN ABOVE THE RAILROAD TRACKS



A GENERAL VIEW WHICH SHOWS THE MOUNTAINSIDE ALONG WHICH THE NEW BATTLE MOUNTAIN ROAD RUNS.

40,000 cu. yd. of earth, 200 cu. yd. of concrete culverts, 1000 lineal ft. of corrugated pipe culverts, 1000 cu. yd. of cement rubble masonry walls to support the fills through the draws and to keep alignment.

At a point known as Station 226 where the road runs above the railroad 500 ft. in elevation and 800 ft. in distance the problem of avoiding interference with

the railroad arose. This was overcome by the laying of mine tracks and the use of mine cars. The trucks of the mine cars were used with wooden bodies of $1\frac{1}{2}$ cu. yd. capacity. The material was loaded and hauled to the various fills on the same principle as mine dumping. The small photograph at the beginning of this article shows this phase of the work.

GOOD WORK WITH A POWER SHOVEL

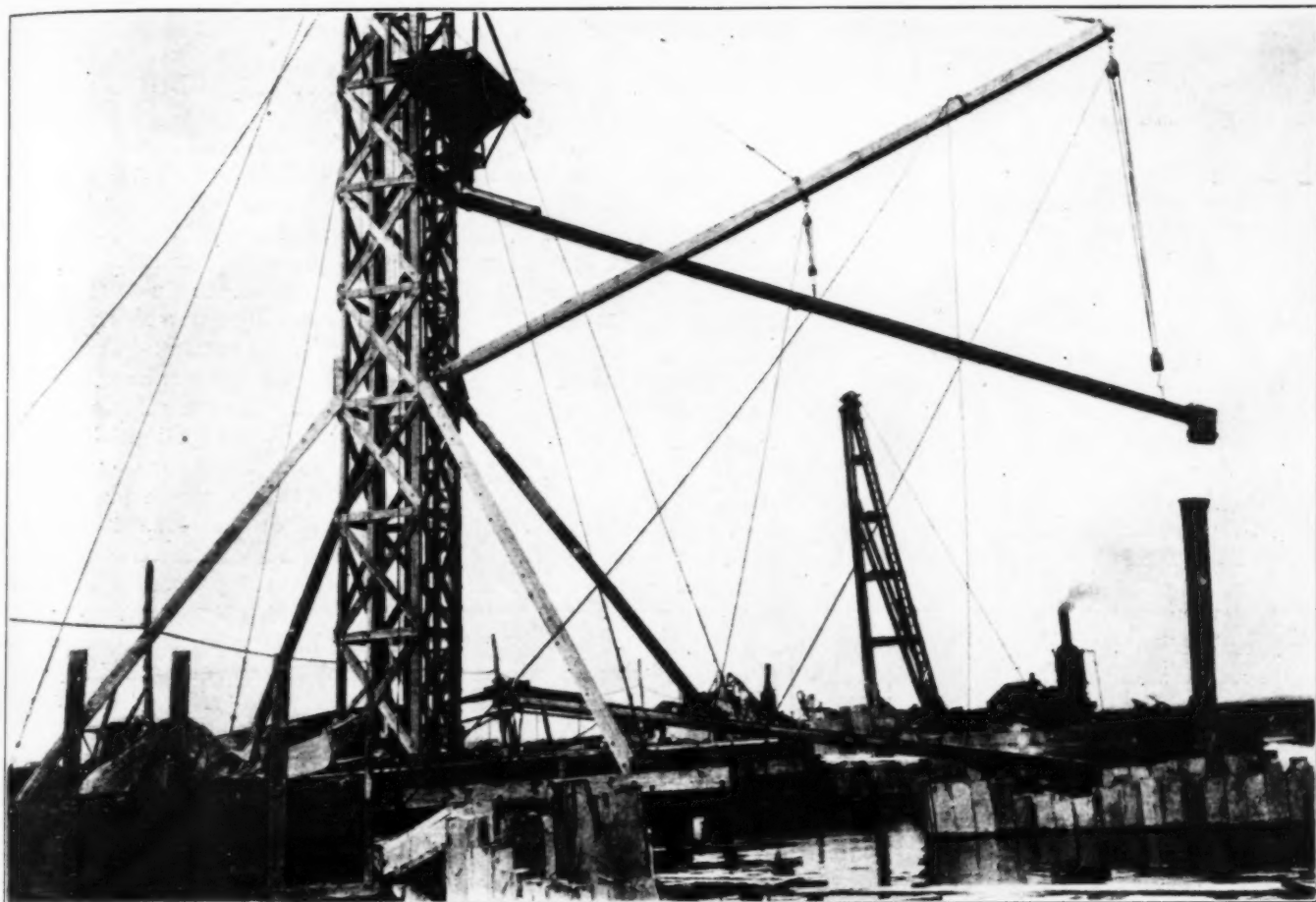
EFFICIENT work with a power shovel is being done by Herman Hohensee, general contractor of Milwaukee in building a reservoir for that city. The photograph below shows its methods of operation.

Approximately 100,000 yd. of material will have to be removed and the job is being handled with trains of three dump cars drawn by horses. At the time the

photograph was taken the shovel was dumping at a height of 17 ft. When this cut is finished the operation will be reversed and a further cut of 14 ft. will be made.

The average day's work is 104 trains of three cars each, each car containing 2 yd., making about 624 yd. in an 8-hr. day.





THE 60-FT. WOODEN TOWER MOUNTED ON TRUCKS USED TO POUR DECK

they were cut off 60 ft. below the surface of the water by means of a marine saw rigged to the pile driver leads. Before the piles were cut off dredging was done to obtain a good bottom and all inspection of the piles after cutting showed them to be uniformly and squarely sawed off.

The cofferdam, a sketch of which is shown, consisted of 65-ft. steel sheathing which were braced by sticks 12 in. by 16 in. and 68 ft. long, which were of Oregon pine brought from the Coast for this work. After the sheathing was driven concrete was tremied to a line as shown in the cross section. For the remainder of the concrete the cofferdam was unwatered and concrete placed by means of a floating plant. One of the illustrations shows the tremie and the flanged pipes which are in sections of from 6 to 18 ft. As shown in the illustration there is a strap fastened to the hopper of the tremie by means of which it is raised and lowered and moved about by a hoisting engine. The hopper holds 1 yd. of concrete.

For use in pumping out the cofferdam two 8-in. centrifugal, one 6-in. centrifugal, one 6-in. pulsometer and one 8-in. pulsometer pumps were used. Boilers furnishing 250 hp. were used to operate the pumps. Coal dust and screened cinders were used to seal the joints in the steel sheathing water-tight.

Another illustration shows the 60-ft. wooden tower mounted on a platform which is in turn carried by trucks intended to run on tracks the full length of the structure to pour the deck. The floating plant consists of a 60-ft. steel tower equipped with a 1-yd. mixer,

hopper storage for 60 yd. of gravel and 30 yd. of sand, cement shed, independent hoist and a 30-ft. counter weight chute all mounted on a scow. The counter weight chute is not shown in the illustration. The steel work is so designed that all forms for the stringers and deck are hung and no false work was used.

The compressible nature of the soil required that the design be such that all loads be transferred vertically to the footings. In spite of the arch appearance which the finished structure will have, this has been provided for.

Another feature of the new structure which is a great advantage over the old is the increased headroom or clearance which the drawspan will have. The number of daily openings required for the old bridge, which only cleared spring tide by about 3 ft., was approximately 40. This number will be reduced by the 12-ft. 6-in. clearance of the new structure to about 4 openings in 24 hours. This increased headroom is made possible by 3 per cent approach grades.

Every precaution was taken by the engineers and contractors to prevent the teredo, a marine worm, from damaging the wood piling. Dredging to a firm bottom before driving was done, and after the piles were sawed off additional dredging was done to insure the pile heads being free of muck. Concrete was then tremied around the pile heads incasing them, as shown in the cross-section on the opposite page.

The bridge was designed by John R. Spelman, New York City, for the Board of Supervisors of Nassau County. W. Fred Starks is County Supt. of Highways.

SHARING THE CREDIT FOR A GOOD JOB

Pennsylvania Road Contractors Entertain Material Men and Equipment Dealers

IN these days where material men and equipment dealers make service their cry and when they wrestle with the contractors' problems as their own—in short, after they have "fit, bled and died" with the contractor over the starting of a big project, it is most gratifying to them to have the contractors and engineers display appreciation of their efforts toward the successful carrying out of a big job.

Winston & Company of Pottstown, Pa., will complete this season an 8½-mile 18-ft. 6:8:6 reinforced concrete road for the Pennsylvania State Highway Department, and recently gave a dinner in honor of the material and equipment men who were in on the job, the keynote of which was satisfaction with and appreciation of the manner in which all concerned had co-operated with the contractors in the successful and early completion of the work.

Upon arrival of the guests and after introductions all around had been made, a fried chicken dinner cooked Southern style, was served. After dinner C. H. Snead, managing partner of Winston & Co., made an address in which he voiced appreciation and acknowledged the worth of the service, co-operation and spirit with which the various dealers and equipment men had worked with his company. He shared with them the credit for the fast work with which the road was being built. After the address was finished the guests were shown over the road and the accompanying photographs, illustrating the methods with which Winston & Co. are doing this job, were taken.

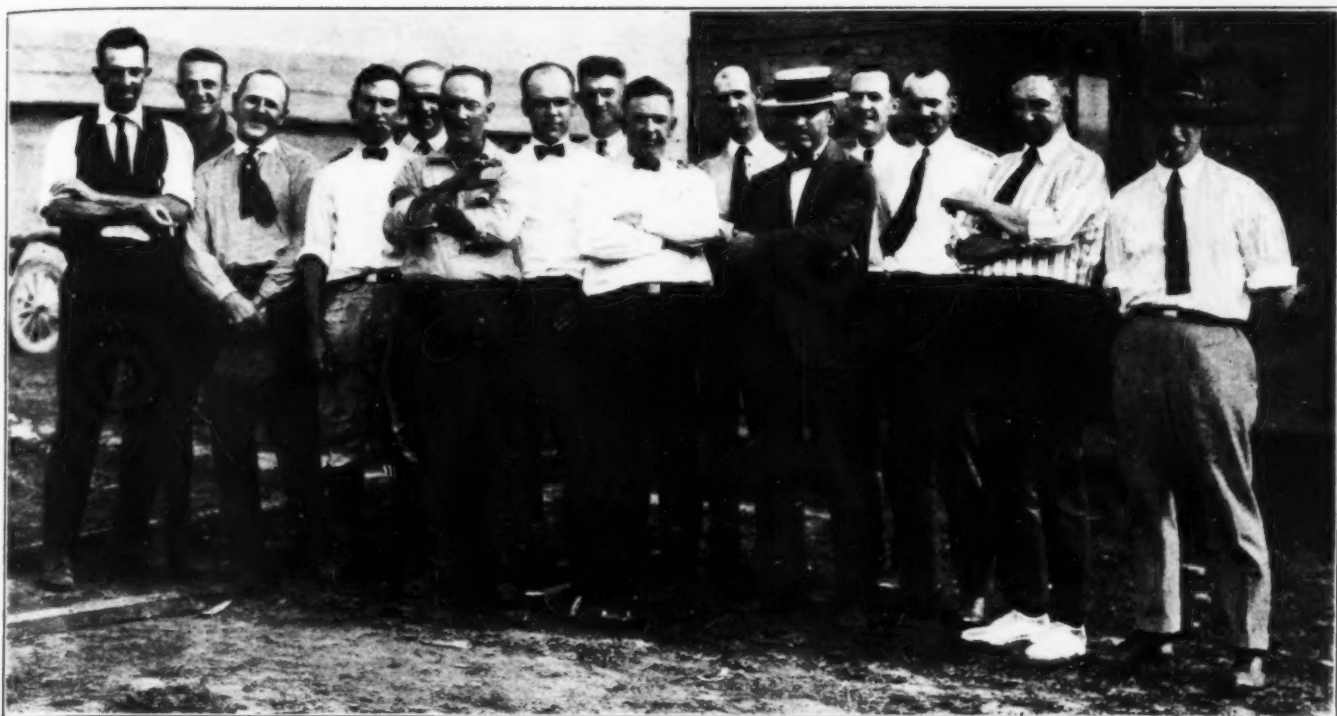
As in most Pennsylvania 1921 road jobs, .56 lb. of reinforcing is required. This reinforcing fabric comes in rolls with rigid joints with an effective cross-section area of .140 sq. in. One of the photographs shows the flatness with which this fabric lies after passing through the straightening device. This device consists of 3 steel rollers mounted on a wooden frame. The fabric is passed through the rolls and drawn out by means of teams or trucks. Often it was found possible to have returning trucks draw a certain length of fabric on each return trip, thus eliminating the necessity of any special team or truck for this work.

This same picture shows the fabric in place 2 in. below the surface lying flat on the concrete, which was screeded off by means of a hand screed so notched as to strike off the concrete at the proper depth to receive the reinforcing. The topping is then applied and the road tamped and finished in the usual manner by means of the tamping machine as shown in the photograph. The other photograph of the actual work shows the perfect condition of the subgrade. A mechanical subgrader which travels on the steel forms performs this work and practically no dressing up by hand shovels was required.

In the photograph showing the guests after dinner, C. H. Snead, managing partner, and Frank Snead, general superintendent of Winston & Co., are shown together with their guests, who include representatives from the cement company, sand and gravel men, motor truck dealers and road machinery sales representa-



PENNSYLVANIA ROAD SHOWING REINFORCING FABRIC IN PLACE. NOTE THE FLATNESS WITH WHICH IT LIES



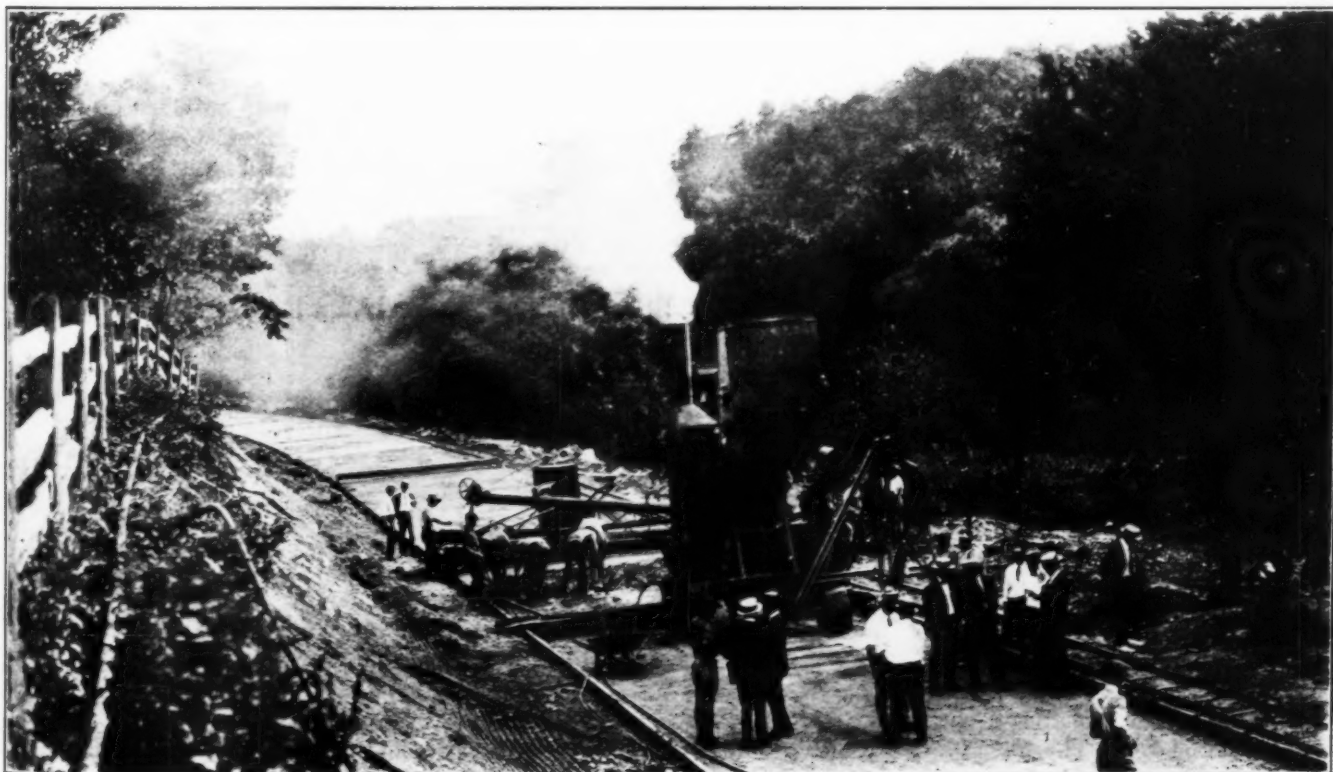
THE GUESTS OF WINSTON & CO. GIVE EVERY EVIDENCE OF ENJOYING THEIR DAY ON THE JOB.

tives. Officials of the Pennsylvania State Highway Department are also included in the photograph.

The industrial railway and the batch boxes hauling from a central storage plant is the method used by Winston & Co., which method is extensively used throughout Pennsylvania on concrete road construction. The photograph at the bottom of the page shows the "batch transfer" with which the mixer is rigged to lift the batches from the industrial rail-

way and transfer it to the loading skip of the mixer.

As this photo was taken at the time when Winston & Co. were showing their guests over the work, the number of persons shown in the view is misleading. The comparatively few laborers which this method of roadbuilding requires is indicated by the number handling concrete between the mixer and the finishing machine. The job, which is known as Route 147, is 44,106 ft. long and will be completed this season.



WATCHING THE PAVER AT WORK.

UNUSUAL WORK FOR A LOADER

Digs "Red Dog" Out of Culm Pile for Use on Pennsylvania Highway



ROAD surfacing in some parts of Pennsylvania is made easy by the use of a material known as "red dog," which is a waste product of the coal mines in that State. The culm from the coal mines is piled in huge hills and with it is mixed a certain amount of coal which often catches fire and burns for a long period. This burning transforms the culm into material resembling slag from a blast furnace and it is this material that is called "red dog" because of its burned-out red color.

The photograph below shows the method of excavation used in Washington County for getting out this

"red dog" and for putting it on the roads. It is difficult to handle because of its unevenness in quality. In some spots it is soft and in others hard and powdery. On this particular job a bucket loader is being used to excavate it and when the machine was put to work it was understood that blasting was to be done ahead of the loader. The blasting method proved unsatisfactory and the loader was finally jammed into the bank and did its duty just as though it were in a gravel pit. F. H. Hickson is in charge of the machine shown in the photograph and is loading from 280 to 300 tons a day direct from the bank.

WYOMING'S PRECAST CONCRETE HIGHWAY IS STANDING UP
UNDER HEAVY TRAFFIC

IN the March issue of SUCCESSFUL METHODS appeared an article by C. H. Bowman, District Superintendent of the Wyoming State Highway Department, describing the laying of precast concrete slabs on the road between Casper and the Salt Creek oil fields. This stretch of 9-ft. precast slab concrete road is 2400 ft. long, and Mr. Bowman has written to SUCCESSFUL METHODS telling of how it has stood up under traffic.

Mr. Bowman says that apparently the slabs are fulfilling all requirements of the heavy traffic which passes over them. The only place where the surface appears to be wearing is on a 7 per cent grade several hundred feet in length. This wear seems to be due

to the fact that the truck drivers are compelled to shift gears while climbing the grade. No settlement of the slabs has been noted and there has been no sign of displacement. Observation of the pavement indicates that with proper construction of the sub-grade pavement of this type laid in a shallow cushion of sand will prove efficient.

As explained in the previous article, all commissary supplies, building material and machinery for the Salt Creek oil fields are hauled 45 miles by motor truck from Casper over the road on which the precast slabs have been laid. Several hundred motor vehicles pass over the road daily, three and five-ton trucks predominating.

World Championship in Concrete Road Building

The winner in this contest will be determined as follows:

1. The best day's run will count 20 points.
2. The best 5 days' run will count 30 points.
3. The best 20 days' run in a single calendar month will count 50 points.

This means that when all the returns are in, the best day's run will be credited with 20 points and the others will be compared with it as a standard. For example, if the best day's work reported is 2,000 square yards of pavement averaging 8 inches thick, that record will be good for 20 points. If the next best day's run is 1,950 square yards of 8-inch pavement, that record will be good for 97.5 per cent of 20 points or 19.5 points. The same procedure will be followed in rating the 5-day and 20-day runs.

The sum of each crew's points in the three classes will be the total for that crew, and the crew having the highest number of points will be placed first, the second highest second, and the third highest third.

The winning crew will receive \$200 to be divided as follows: one-third to the superintendent, one-third to the foreman and one-third to the other members of the crew.

The winners of second place will receive \$125 to be divided in the same manner.

The third prize will be \$75, also to be divided, one-third to the superintendent, one-third to the foreman and one-third to the other members of the crew.

There will be no entry fee. All that is necessary is to clip out the following blank, fill it in properly and mail it to Successful Methods on or before November 10, 1921.

There is no limit to the number of crews that one contractor may enter and work done at any time this season will count.

The world's record is at stake!

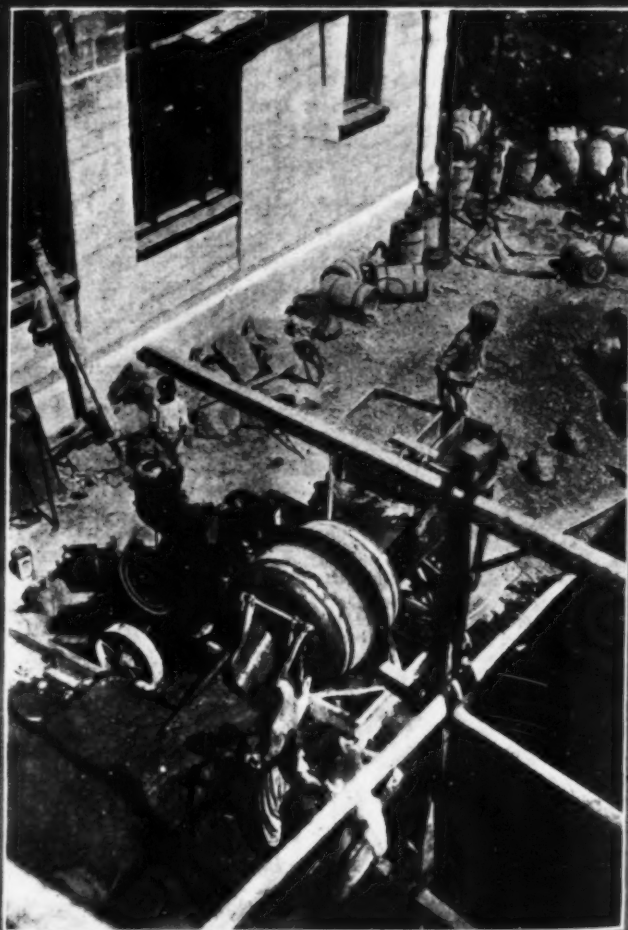
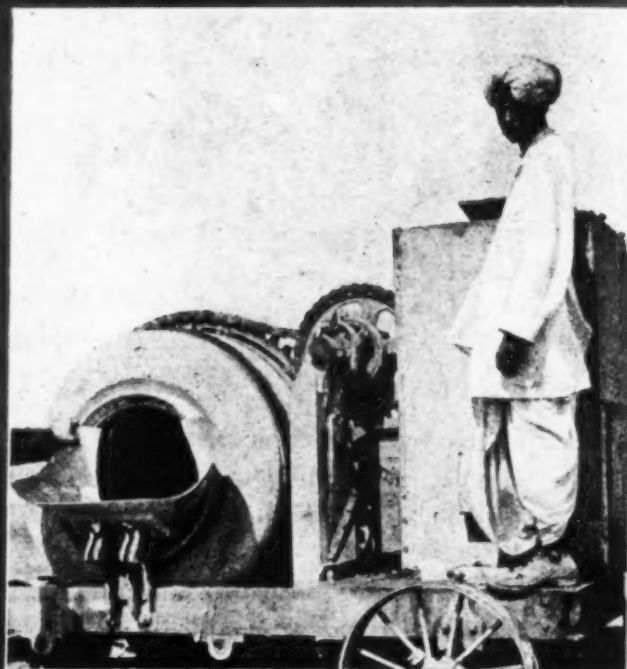
Has your outfit got the punch to win it?

ALL ENTRIES FOR THE WORLD CHAMPIONSHIP IN CONCRETE ROAD BUILDING MUST BE MADE ON THE FOLLOWING BLANK

1. Size of mixer.....
2. Number of bags of cement per batch.....
3. Proportion of cement and sand.....
4. Time of mix required by specifications.....
5. Number of hours per day.....
6. Width and thickness of concrete slab. Give specifications
7. Best one day's run in feet with date.....
8. Best 5 consecutive days' run in feet with dates.....
9. Best 20 days' run in any one calendar month in feet with dates.....
10. Location of job, giving state, county, name or number of project.....
11. Name of state or county engineer in charge.....
12. Name of contractor.....
13. Name of superintendent in charge.....
14. Name of foreman of crew.....

Cut out and mail before November 10th to Successful Methods, Inc., 141 Centre St., New York City.

Building Construction in India



These four photographs show how building construction is carried on in India. The work is a queer mixture of modern machinery and ancient methods. The women shown in the photographs are kept busy carrying the concrete from the mixer to the forms in small steel buckets which are passed up to them from below.

BULK CEMENT ON ROAD JOB

THE reclaiming of coal from the Schuylkill River, which had been washed from the culm banks of the coal mines around Harrisburg, Pa., has developed a method for handling fine materials which Superintendent Edwards of the Pottsville Construction Co. turned to good account in the handling of bulk cement on a road job near Pottsville, Pa. The upper photograph shows the cement house out of which projects a covered bucket conveyor. The lower part of this conveyor, which may be seen on the ground alongside the shed, extends into the car. The cement is



conveyed to the center of the shed at the top and spouted to place. Two men unload a car of cement in 4 hours. A tractor furnishing motive power may be seen in this picture.

The lower illustration shows the other side of the same cement house and the manner in which the batch boxes are charged. Wheelbarrows are loaded in the shed and pass over scales just inside each doorway. After a few trials the wheelbarrow man becomes sufficiently expert in gaging his load so that no time is lost at the scales. All cement proportion-



ing is done by weight and not volume. The carryalls discharge into hoppers underneath the platform, which dump into industrial cars without loss of time. Two men are all that are used to handle the wheelbarrows. The job consists of 6 miles of 18-ft. reinforced concrete road, which will be completed this season.

The handling of bulk cement is a feature of concrete road building and general construction work that is decidedly in its infancy. Some of the methods tried out have not been successful. In the

November issue of **SUCCESSFUL METHODS** the weighing device which is being used by the Parklap Construction Company on the construction of the big dam across the Hudson River, near Glens Falls for the International Paper Company, will be described.

Contractors and engineers in general are interested in the solution of this problem and **SUCCESSFUL METHODS** will be glad to print descriptions of methods of handling bulk cement which have been tried out and found satisfactory.

WHERE THE ROCK OUTCROPS

THE two photographs show the method which is used to excavate in built-up sections of New York City, where the rock outcrops. At the Battery solid rock is found at a depth of 70 ft. As the picture, which was taken at 207th Street, near Broad-



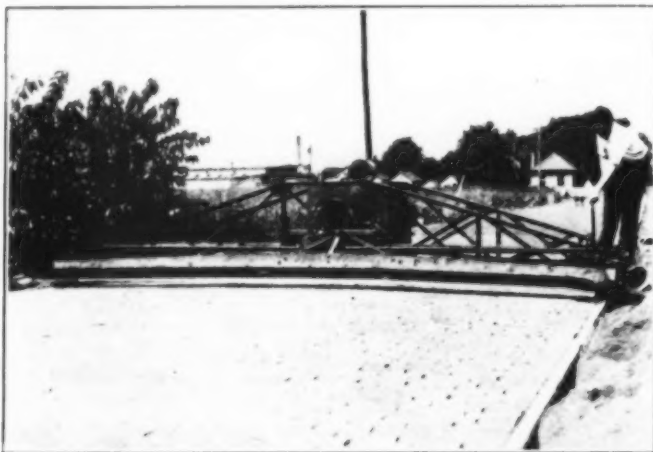
way, indicates, the rock rises considerably above the street level in places in the upper part of the city. The first picture, which was taken just before a blast, shows the precautions which are taken to guard against flying rock. Logs and poles chained together, which are first covered with rope mats, and in turn covered with pieces of corrugated iron are placed on top of the rock where the shot is to be made.



The other view indicates the broken rock is handled into motor trucks for disposal by means of a hoisting engine. Air drills are used to put down the holes, the air being furnished by portable compressors. In this instance the logs were raised a few inches and no damage whatever was done.

CONCRETE FINISHING MACHINE USED ON MONOLITHIC PAVEMENT

THE so-called monolithic type of brick pavement design provides for a rigid pavement throughout. The brick are laid in green concrete and the joints between the brick are filled with a rich mixture



of sand and cement applied at the consistency of thin cream.

Before the cement grout is applied the brick are thoroughly wet by sprinkling to temper the bedding course and to strengthen the bond of the cement filler to the brick. In Ohio considerable mileage of this type of highway has been constructed, and the accompanying photograph shows the method which

A. E. Freshwater & Sons, contractors of Painesville, Ohio, use in tamping the bricks in place. A concrete tamping and finishing machine is operated in the same manner as on a concrete road. The merit in this type of pavement is that it sets up as a unit and the expense of concrete curb or edging is saved as none is required.

FULLY SUBMERGED

WITHOUT bothering about dimensions, the maximum height which the steam shovel in the picture can handle excavated material is illustrated graphically. In the picture the shovel is shown practically submerged while the dipper clears the dump



wagon considerably. The excavation shown was made at the U. S. Base Hospital, Chicago, and the contractor was the Herbert Ripley Wrecking & Excavating Co. of Chicago.

HOW ILLINOIS MARKS DETOURS

THE Division of Highways of the Illinois Department of Public Works has issued a manual on road construction written by B. H. Piepmeier, Engineer of Construction. It is meant for the use of resident engineers and inspectors but contains a great deal of material that will be of use to almost anyone engaged in the business of road construction.

The Illinois Division of Highways is doing its work in a thorough manner and one evidence of this fact is furnished by the reproductions in the construction

manual of the signs which are used to indicate detours when roads are closed for construction. Three of these signs are shown on this page. The manual contains explicit instructions as to just how they should be placed and maintained.

ROAD CLOSED

BY ORDER OF—

CLIFFORD OLDER, CHIEF HIGHWAY ENGINEER

VIOLATORS SUBJECT TO ARREST

PENALTY: FINE, IMPRISONMENT
OR BOTH

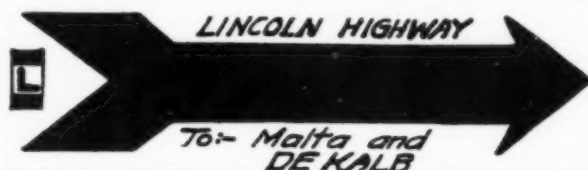
OPEN ONLY TO RESIDENT AND CONTRACTOR'S TRAFFIC

FOLLOW MARKED DETOUR

West 2 mi. South 2 mi. East 2 mi.
back to Main Road

Engineer in Charge will indicate Exact Routing of Detour Giving Mileage and Direction

DETOUR FOR ROUTE 6



SLOW

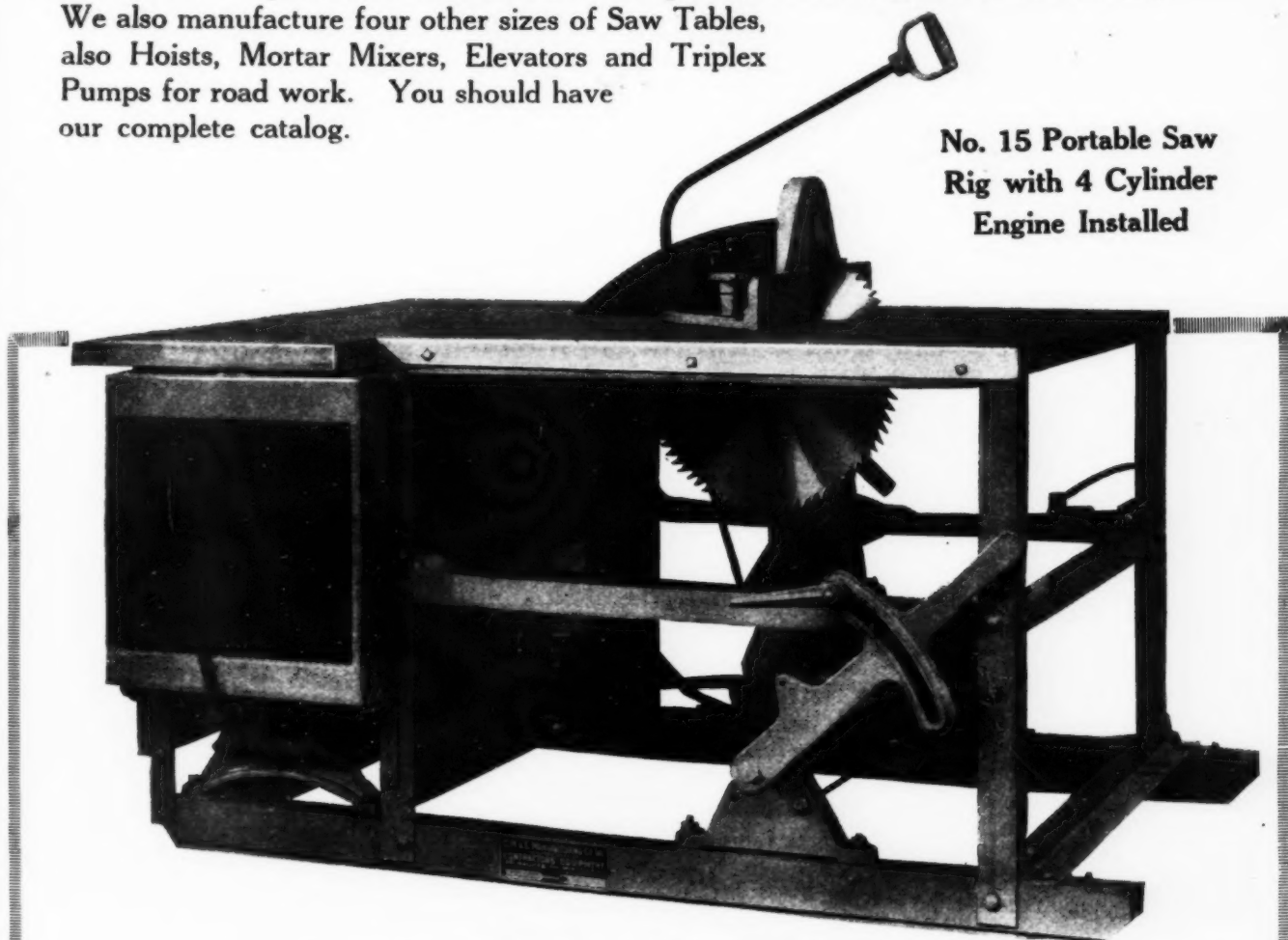
BARRICADE - 400FT

C. H. & E.

Portable Saw Rigs

If you are sawing by hand, all your form lumber, this No. 15 Saw Rig is the outfit you want. A powerful machine that will rip 6 inch and cross cut 8 inch lumber. We also manufacture four other sizes of Saw Tables, also Hoists, Mortar Mixers, Elevators and Triplex Pumps for road work. You should have our complete catalog.

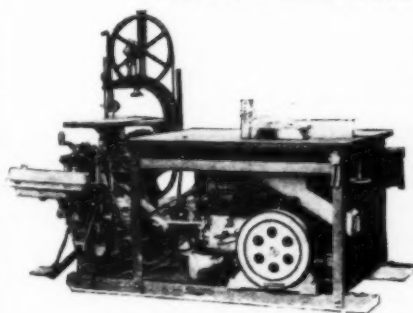
No. 15 Portable Saw
Rig with 4 Cylinder
Engine Installed



C. H. & E. MANUFACTURING CO.

384-A Clinton Street

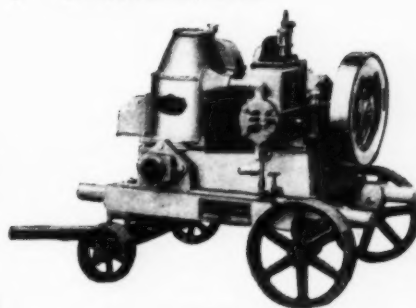
Milwaukee, Wis.



NO. 6 SAW RIG

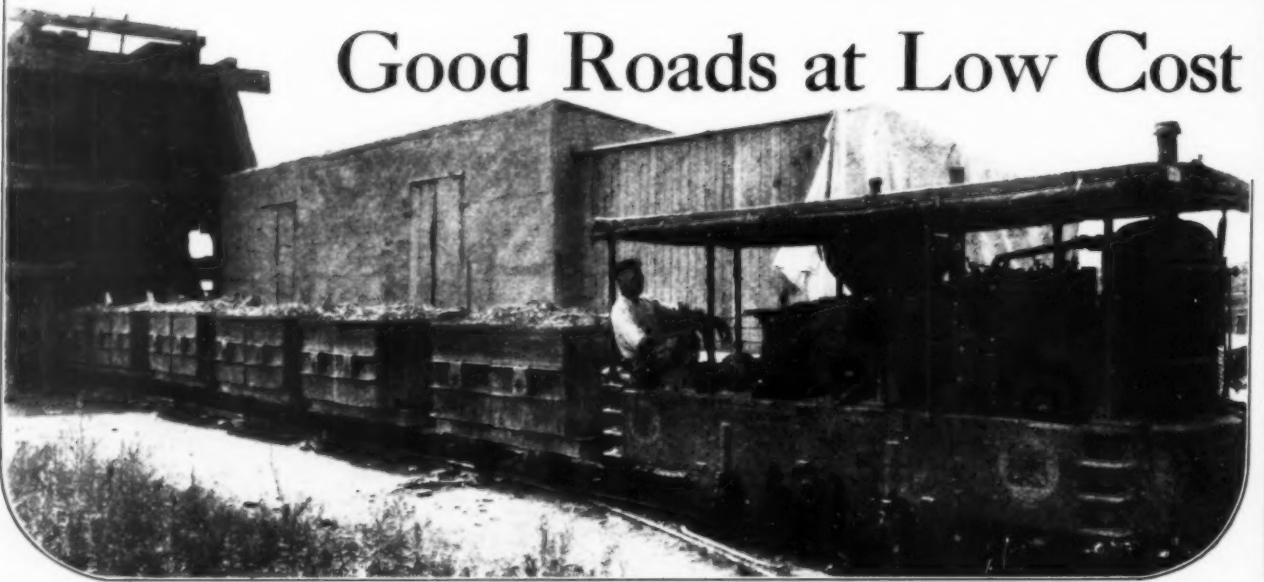


NO. 2 MORTAR MIXER



No. 4 BILGE PUMP

Good Roads at Low Cost



Contractors who build the best roads at the lowest cost (and with the greatest profit) know the value of durable equipment that gives years of service without replacement.

The use of Hyatt Roller bearings on cars and locomotives makes them durable and dependable. Equipment of this class is being used to advantage on the New Jersey State Highway job, route No. 6, by Michael Staub of Swedesboro, N. J. and Mamaroneck, N. Y.

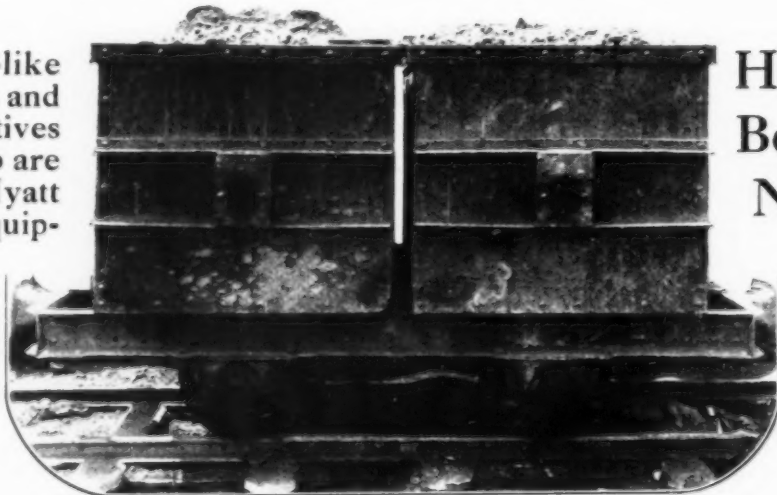
The haulage equipment on this job consists of 48 Hyatt bearing Lakewood cars and two 6-ton Hyatt bearing Burton locomotives.

Over a distance of two miles each locomotive hauls 15 cars of 5700 lbs. capacity, total train weight 51 tons. Material handled daily 300 tons. The road is concrete, 18' 6" wide, 8 $\frac{3}{4}$ " thick, 7.2 miles long.

Durable Hyatt bearings cut maintenance costs and prevent delays, their easy running qualities permit more cars per locomotive, their grease-tight housings save lubricant costs (labor and material).

Specify that your cars and locomotives be Hyatt roller bearing equipped—you'll find them as good an investment as does Michael Staub.

The business-like Lakewood cars and Burton locomotives used on this job are typical of the Hyatt roller bearing equipment that is cutting costs and boosting profits for contractors everywhere.



Hyatt Roller
Bearing Co.
New York
N. Y.